

Applicant: Campagnolo et al.
Application No.: 10/690,042

IN THE CLAIMS

1. (currently amended) A process for controlling when gear shifting occurs in a transmission of a cycle having at least one gear sprocket coaxially mounted to hub of a rear wheel of the cycle and a transmission chain engaged with said sprocket, the process comprising the steps of:

~~assigning said at least one gear sprocket at least one given angular position in which shifting is facilitated;~~

providing a sensor that detects a marker that rotates about an axis parallel to an axis of rotation of the at least one sprocket, said marker having angular positions corresponding to no. forward, and rearward movement of the transmission chain ~~to detect said angular position of said at least one gear sprocket in which shifting is facilitated;~~ and

selectively activating said sensor according to a command request to initiate a shift.

2. (currently amended) The process according to claim 1, further comprising the steps of preventing a shift when said sensor detects no movement or rearward movement in the transmission chain ~~that said gear sprocket is not in the angular position in which shifting is facilitated~~ and allowing a shift when said

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sensor detects forward movement in the transmission chain ~~that said gear sprocket~~
~~is said angular position in which shifting is facilitated.~~

3. (cancelled)

4. (cancelled)

5. (currently amended) A system for controlling when gear shifting occurs in the transmission of a cycle, the system comprising:

~~at least one gear sprocket having at least one angular position in which shifting is facilitated;~~

at least one sensor that detects a marker that rotates about an axis parallel to an axis of a sprocket coaxial with a rear hub of a cycle wheel, said marker having angular positions that correspond to no, forward, and rearward movement of a transmission chain engaged to the sprocket ~~for detecting the angular position in which shifting is facilitated and generating a corresponding signal; and~~

a control unit for activating said sensor according to a command request.

6. (currently amended) The system according to claim 5, ~~further comprising a transmission element, wherein said control unit is configured for~~

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~~controlling preventing~~, in response to the corresponding signal, a gear shift when the sensor detects no or rearward movement of the transmission chain, and allowing, in response to the corresponding signal, a gear shift when the sensor detects forward movement of the transmission chain ~~a change in position of the transmission element with respect to the at least one gear sprocket when the sensor detects the angular position in which shifting is facilitated.~~

7. (currently amended) The system according to claim ~~6-5~~, wherein the at least one ~~gear sprocket~~ sensor is associated ~~to~~ with a crank axle of the cycle, and rotation of the crank axle corresponds to the forward and rearward movement of the chain, ~~and wherein said at least one facilitating angular position corresponds to at least one set of teeth of said gear sprocket.~~

8. (currently amended) The system according to claim ~~6-5~~, wherein said at least one sensor is associated to one of a crank axle of said cycle and a tensioning element.

9. (currently amended) A method for controlling gear shifting on a bicycle having a plurality of ~~sprockets~~ gears with at least one ~~sprocket~~ gear including teeth with a sequence of differentiated geometries which define

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facilitating portions on said gear ~~sprocket~~, the teeth carrying a transmission element, the method comprising the steps of:

a) detecting a processing signal representative of an affirmative shift command;

b) detecting an angular position of the at least one gear ~~sprocket~~ by detecting a marker that rotates about an axis parallel to an axis of a hub of a rear wheel in response to the processing signal;

c) comparing the angular position of the at least one gear to the angular position of the facilitating portions of the at least one gear;

d) shifting the transmission element from the at least one gear ~~sprocket~~ to another gear ~~sprocket~~ if the detected angular position of the at least one gear corresponds to one of the facilitating portions,

wherein steps (b)-(d) are performed only after step (a).

10. (currently amended) The method of claim 9, wherein the steps (a) - (d) are ~~continuously~~ repetitively performed.

11. (currently amended) A system for controlling gear shifting in a transmission of a cycle comprising at least one gear wheel on which is engaged a transmission element that performs transmission of motion as a result of its

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advance in a pre-determined direction; the gear shifting being carried out by changing the position of engagement of said transmission element with respect to said at least one gear wheel, wherein said at least one gear wheel has at least one given angular position in which the shifting of said element for transmitting motion is facilitated, said system comprising:

at least one sensor that detects a marker that rotates about an axis parallel to an axis of a rear wheel hub, said marker having an angular position corresponding to ~~for detecting~~ the position of said at least one gear wheel for generating a respective signal;

a control unit for controlling, starting from said respective signal, the change of the position of said element for transmitting motion;

at least one switch for selective activation of said at least one sensor according to a command for changing the position of said element for transmitting motion with respect to said at least one gear wheel; and

said control unit being configured for preventing shifting of said at least one gear wheel when the gear wheel is not in an angular position corresponding to said at least one given angular position, and then allowing change of position of said transmission element when said at least one gear wheel is rotated to a next angular position corresponding to said at least one given angular position.

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12. (original) A process for controlling gear shifting in the transmission of a cycle comprising at least one gear which engages a transmission element that performs transmission of motion as a result of its advancement in a pre-determined direction; the gear shifting being carried out by changing the position of engagement of said transmission element with respect to said at least one gear, the process comprising the steps of:

detecting the angular position of said at least one gear;

controlling change of position of said element for transmitting motion with respect to said at least one gear depending on the detected angular position;

providing sensor means for detecting the angular position of said at least one gear; and

selectively activating said sensor means according to a command request for changing the position of said element for transmitting motion with respect to said at least one gear.

13. (new) The process of claim 1 further comprising providing a chain tensioner that engages the transmission chain, wherein the chain tensioner comprises the sensor.

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14. (new) The system of claim 5 further comprising a chain tensioner that engages the transmission chain, wherein the chain tensioner comprises the sensor.

15. (new) The method of claim 9 further comprising providing a chain tensioner that engages the transmission chain, wherein the chain tensioner comprises the sensor.

16. (new) The system of claim 11 further comprising a chain tensioner that engages the transmission chain, wherein the chain tensioner comprises the sensor.

17. (new) A process for controlling when gear shifting occurs in a transmission of a cycle having at least one gear, the process comprising the steps of:

assigning said at least one gear at least one given angular position in which shifting is facilitated;

providing a sensor that detects a marker located coaxial to a crank axle that drives the transmission, the sensor detecting an angular position of the marker corresponding to the angular position of the at least one gear in which shifting is facilitated; and

selectively activating said sensor according to a command request to initiate a shift.

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18. (new) A system for controlling when gear shifting occurs in the transmission of a cycle, the system comprising:

at least one gear having at least one angular position in which shifting is facilitated;

at least one sensor that detects a marker located coaxial to a crank axle that drives the transmission, the sensor detecting an angular position of the marker corresponding to the angular position of the at least one gear in which shifting is facilitated and generating a corresponding signal; and

a control unit for activating said sensor according to a command request.

19. (new) A method for controlling gear shifting on a bicycle having a plurality of gears with at least one gear including teeth with a sequence of differentiated geometries which define facilitating portions on said gears, the teeth carrying a transmission element, the method comprising the steps of:

a) detecting a processing signal representative of an affirmative shift command;

b) detecting an angular position of the at least one gear by detecting a marker located coaxial to a crank axle of the bicycle, the detection step initiated in response to the processing signal;

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c) comparing the angular position of the at least one gear to the angular position of the facilitating portions of the at least one gear;

d) shifting the transmission element from the at least one gear to another gear if the detected angular position of the at least one gear corresponds to one of the facilitating portions,

wherein steps (b)-(d) are performed only after step (a).

20. (new) A system for controlling gear shifting in a transmission of a cycle comprising at least one gear wheel on which is engaged a transmission element that performs transmission of motion as a result of its advance in a pre-determined direction; the gear shifting being carried out by changing the position of engagement of said transmission element with respect to said at least one gear wheel; wherein said at least one gear wheel has at least one given angular position in which the shifting of said element for transmitting motion is facilitated, said system comprising:

at least one sensor that detects a marker located coaxial to a crank axle that drives the transmission, the sensor detecting an angular position of the marker corresponding to the angular position of the at least one gear wheel for generating a respective signal;

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a control unit for controlling, starting from said respective signal, the change of the position of said element for transmitting motion;

at least one switch for selective activation of said at least one sensor according to a command for changing the position of said element for transmitting motion with respect to said at least one gear wheel; and

said control unit being configured for preventing shifting of said at least one gear wheel when the gear wheel is not in an angular position corresponding to said at least one given angular position, and then allowing change of position of said transmission element when said at least one gear wheel is rotated to a next angular position corresponding to said at least one given angular position.